THE PUBLIC.

425 Lafayette Street
New York, NY 10003

January 15, 2015

Chairman Tom Wheeler
Commissioner Mignon Clyburn
Commissioner Jessica Rosenworcel
Commissioner Ajit Pai
Commissioner Michael O'Rielly
c/o Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: Comments in ET Docket No. 14-165 and GN Docket Nos. 12-268 and 14-166 Via Electronic Filing

Dear Chairman Wheeler, Commissioner Clyburn, Commissioner Rosenworcel, Commissioner Pai, Commissioner O'Rielly and Ms. Dortch,

On behalf of The Public Theater, located in New York, NY, that provides approximately 1,400 performances a year to approximately 300,000 audience members [The Public Theater is dedicated to achieving artistic excellence while developing an American theater that is accessible and relevant through productions of challenging new plays, musicals and innovative stagings of the classics at both our summer home at The Delacorte Theater in Central Park, and our year-round home at 425 Lafayette Street in downtown Manhattan.], I write with concern about protection for our wireless microphones and backstage communications devices.

I understand the Commission has ruled that performing arts entities that regularly use 50 or more wireless devices will be eligible to apply for a Part 74 license. I've also learned that the FCC is seeking Comment on a proposed rule that would prevent performing arts entities using fewer than 50 wireless devices from participating in the database. This would leave my organization without any interference protection mechanism from the many TV Band Devices that may soon flood the market. Frequency coordination with other known wireless microphone users has become common practice, but there is no way to coordinate with TVBD's if you don't know about them.

Thousands of performances are held by professional performing arts organizations each year and the use of wireless microphones is both essential to producing high-quality performances and also mitigates against significant public safety concerns. Professional wireless capability, with successful interference protection, is essential to our sector.

At our downtown location, The Public uses a fair bit of Wireless Intercom (Telex/HME) – We used **5 Dual-Channel Intercom Base Stations** comprising **20 Wireless Belt-packs** utilizing a total of **30 Discreet Channels of RF.** We also use a fair bit of In-Ear

Monitoring. We had **7 Permanent IEM's** during our Fall 2014 season. Not including artist provided IEM's at Joe's Pub that are becoming more and more popular.

At The Delacorte Theater in Central Park, The Public uses a fair bit of Wireless Intercom (Telex/HME) – We used **3 Dual-Channel Intercom Base Stations** comprising **12 Wireless Belt-packs** utilizing a total of **18 Discreet Channels of RF, and** we have **4 Permanent In-Ear Monitors (IEM).**

At our downtown location, the maximum number of Wireless Microphones in use during the Fall 2014 season was **84 Wireless Microphones** comprising both handheld and body-pack transmitters. The average number of wireless microphones in use during the Fall 2014 downtown season was **75 Wireless Microphones** comprising both handheld and body-pack transmitters.

A **typical play at The Public** has at **minimum** 4 Wireless Microphones (2x courtesy announce microphones for the Director) and 1 Intercom Base-Station with 4 Belt-Packs comprising 6 Discreet Channels of RF. A **typical musical** has at **minimum** 24 Wireless Microphones, 2 Intercom Base-Stations with 8 Belt-Packs comprising 12 Discreet Channels of RF, and 4 In-Ear Monitors (IEM).

At The Delacorte Theater in Central Park, the maximum number of Wireless Microphones in use during the 2014 season was **44 Wireless Microphones** comprising both handheld and body-pack transmitters. The average number of Wireless microphones in use at the Delacorte during the 2014 season was **36 Wireless Microphones** comprising both handheld and body-pack transmitters.

Every single presentation we do, from the smallest panel discussion to the largest musical uses wireless devices in some form.

At our downtown space, we use partial if not all allowable space in Channels 14, 17, 19, 20, 21, 22, 27, 28, 32, 34, 35, 37, 39, 41, 42, 43, 45, 46, 47, 48, 49, 50, 51. This spans the bulk of the legal white space from 400mHz to 900mHz. When we are lucky enough to have a show with SK5212's, they have a 24mHz switching bandwidth and we pair them with Sennheiser EM3532 receivers that have a 36mHz switching bandwidth, down to .005 mHz.

At The Delacorte in Central Park, we use partial if not all allowable space in Channels 16, 18, 20, 21, 22, 26, 27, 32, 34, 35, 37, 39, 45, 46, 47, 48, 49, 50 This spans the bulk of the legal white space from 400mHz to 900mHz. We have two SK5212's which are tunable, they have a 24mHz switching bandwidth and we pair them with Sennheiser EM3532 receivers that have a 36mHz switching bandwidth, down to .005 mHz. We also have 8 Sennheiser 2000 series

All of our microphones are able to tune to more than one frequency – however it is a mixed issue. The main transmitters we use are Sennheiser SK50, SK5012, and SK5212. The SK50 and the SK5012 transmitters have six fixed-frequencies that they are allowed to tune to, they are not user changeable and every time we need to find a new frequency it

requires that we send those transmitters in to an authorized RF Engineer to have their internal circuitry re-tuned to a different six frequencies. Often times, we are only able to get about 2 usable frequencies out of them. The other 4 often-times overlap neighboring DTV stations or cause intermod with the other packs we use.

At our downtown space, The Public rarely utilizes RF devices outside of TV bands. In the 2014 season, we had 1 microphone below the TV bands (in the upper 400mHz range) and we had 8 microphones above the TV bands (in the lower 900mHz range). At The Delacorte in Central Park, The Public has no devices outside of the TV bands.

Every RF device we use is completely analog, we have no digital wireless. We have beta-tested 2.4gHz digital wireless devices at The Public in past season, to discontent and failure.

The Public rents all wireless devices for our downtown space. We own a small compliment of wireless microphones for use in the Delacorte – this system is comprised of 38 wireless microphones, including 24 fixed-frequency SK50 body-pack transmitters, 4 fixed-frequency SK5012 body-pack transmitters, 2 fixed-frequency SKM5000 hand-held transmitters, 2 freely tunable Sennheiser SK5212's, and 6 freely tunable Sennheiser 2000 series body-pack transmitters. However we rent all wireless intercom, IEM's, and 2 wireless microphones for director announcement mics. For other events we rent surplus microphones. Reasonable life-expectancy on the SK50's, SK5012's, and SK5212's is 10-15 years with yearly service due to their solid metal enclosure and durable build quality. Reasonable life-expectancy on the 2000 series is 5-10 years due to their cheaper plastic housing.

What the FCC can do to ensure ease of user transition with the white space reallocation is a multi-sided issue. The first step is to push for proper end-user education. We can fit a lot of bandwidth into a single DTV channel, however users need to be trained on how to properly coordinate and trouble-shoot their wireless. We need the FCC to push manufacturers to ship devices with low power consumption out of the box instead of set automatically to the highest power (50mW transmission power on Sennheiser vs. 250mW transmission power on Lectrosonics) and we need to train users to not automatically set their devices to the highest transmission power automatically and instead of step up their power based on a variety of factors dependent on the way in which they are being used.

The second thing the FCC can do is to get funding to the manufacturers who are pushing the edge in developing bandwidth-efficient. Within 5 years, Sennheiser was able to take the switching bandwidth on their SK5212 mk1 from 24mHz to up to 184mHz on their SK5212 mk2 – it comes with a massive cost premium, but the form factor and power consumption stayed exactly the same which is a pretty wild leap in bandwidth efficient wireless. Radioactive Wireless is doing the same thing for wireless intercom – you can use 30 of their base stations with 180 beltpacks in the same RF Footprint as a current generation base station and 4 current generation beltpacks.

The final thing the FCC can do is provide funds to ease users through the transition. The 700mHz reshuffle had the cost put on to manufacturers and consumers – with

manufacturers putting out rebates as a bonus for consumers who were forced to move. We need to see the corporations buying out the bandwidth paying consumers to move wireless – the wireless devices we use in theater are not cheap. A single beltpack used in a major theatrical production is $2,500, a single receiver is $3,200, and a single intercom base station with 4 beltpacks closes in on around $10,000.

Nothing would persuade The Public from moving out of the white space for the TV band. It offers the best wireless propagation for what we use the bands for 2.4gHz and 5gHz spectrum is already so cluttered as to make devices at the quality we need for entertainment unusable. Anything below the TV bands will take more power, which means larger belt-packs.

I appreciate that the Commission has sought Public Comment on these very important issues. Professional performing arts organizations should all have some sort of interference protection. While some entities will be protected by access to the geo-location database, many professional performing arts organizations will not under this plan. Further, I would request that the Commission consider the burden already borne by the performing arts community in vacating the 700 MHz band. I am concerned about the cost of once again replacing my theatre's sound equipment.

Performing arts organizations provide demonstrable service to the public in improving quality of life; preserving our cultural heritage; and in providing education, enlightenment, entertainment. They also contribute to local economies in every community across this country. I respectfully request that the Commission maintain access to interference protection and establish a mechanism to reimburse performing arts organizations for the cost of new equipment.

Sincerely,

Patrick Willingham
Executive Director